Newsletter of the North American Mycological Association

THE MYCOPHILE

VOLUME 46:3 MAY / JUNE 2005 WWW.NAMYCO.ORG

Amanita virosa, photo courtesy of John Plischke III

"We Told You So!"

Summary of Mushroom Poisonings in 2004

by Michael W. Beug, Ph.D., Chair, NAMA Toxicology Committee

In 2004 members of the Toxicology Committee reviewed and often investigated reports of 148 humans poisoned, including 40 children and adolescents. We also received reports of 51 dogs stricken by eating mushrooms.

For the first time in several years there were four reports of human deaths—three confirmed and one possible—from mushrooms. We feel that this was due to the fact that the mushroom season in the western half of the United States was exceptional, with record fruitings of many species.

In addition, the hurricanes that affected the Southeast brought lots of rain during mushroom season there. With a record abundance of mushrooms and an increased interest in the harvest of edible wild mushrooms, there was an associated increase in the total number of poisonings.

Story continues on page 9. More photos on pages 2 and 15.

On to Wisconsin!

Our very first venture into the Wisconsin woods along the banks of the Mississippi River is coming up soon. NAMA's 2005 Annual Foray will be held at the University of Wisconsin at La Crosse, July 21–24, with Dr. Tom Volk as Host Mycologist. Plans include at least one or two workshops and some fascinating talks on subjects both international and unusual.

Tom will introduce us to the local flora and fauna of the region and enlighten us on the fungi that accompany them. Among some of the presenters are Dan Czederplitz, sharing with us his experiences collecting fungi in Belize, a novel session on indoor air quality that should be of great interest, and Britt Bunyard's mysterious *Agaricus* pseudopollination topic. Walt Sundberg will be offering his popular "hand lens anatomy" on demand, and Bart Byuck, the *Russula* problem-solver, will return to us from France. Heather Hallen will bring us up to date on *Amanita* toxins, and ex-president Gary Lincoff will, as usual, have something up his sleeve. Dr. Andrew Methven will serve as Principal Mycologist, and Adele Mehta once again will keep track of our collections as Recorder.

We are eager to see the fabulous old-growth American chestnut forest. Tom's students will likely share their expertise on the trees with us as well as assist with other forays. It will be a real opportunity for us to see firsthand what it takes to be a mycological student these days.

We will b housed in a single dormitory with both a kitchen and social room. There is a reduced registration charge for those of us willing to bunk on the upper two floors. Although there is no air conditioning in the dorms, fans are available for a small fee. The average July high temperature in La Crosse ranges between the lower and mid eighties, absolutely balmy for those of us from lower latitudes. If you prefer off-campus accommodations, they are listed below.

This promises to be one of our very special forays, not only for the unusual non-glaciated habitats we

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Chlorophyllum molybdites, photo courtesy of John Plischke III

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PRESIDENT'S MESSAGE

I've been reading a lot lately about the struggle that the Food and Drug Administration (FDA) is having with defining what constitutes an "expert wild mushroom identifier." The need for such a definition arose due to restaurants that buy "wild" mushrooms from other than "approved" sources (meaning those of us who go into the woods and gather them).

I received a call from the FDA about a year ago and was asked to define an "expert wild-mushroom identifier." That was a tough one. The only thing that I knew for sure was that being president of NAMA did not make you an "expert." Over the years I've learned that there's much more I don't know about identifying mushrooms than what I do. Anyway, I struggled with this question and decided my input would only confuse the matter more.

How would you define an "expert wild-mushroom identifier"? Maybe that would be a good contest, to see who could come up with an answer that would satisfy all of the agencies which will eventually become involved. The focus now has shifted away from a definition and onto the restaurants to obtain "specifications" about the mushrooms being bought and the qualifications of the identifier. The FDA and other agencies are in the process of developing a brochure to provide more guidance. Luckily, I know the chef at a local restaurant who will take, without question, my "wild" mushrooms and prepare them for me (but just for me or my company). Will I soon have to provide him with pages of information about the mushroom and myself? Probably so.

If you haven't registered for the Wisconsin foray in July, don't wait too long. The foray is shaping up to be a great one and a new experience for NAMA members as we have never had a national foray in Wisconsin. Thanks again to Tom Volk for offering to host the foray and to all of those working with him to make it a success. —*Ike*

A

B

C

A) *Volvariella volvaceae*, the paddy straw mushroom, growing wild in mulch. B) *Volvariella pusilla*. C) *Volvariella volvaceae*, the paddy straw mushroom, commercially cultivated and canned. (All photos courtesy of John Plischke III)

See Summary of Mushroom Poisonings, beginning on page 1.

Moving?

Please send your new address, ***two weeks*** before you move, to

Ann Bornstein
NAMA Membership Secretary
336 Lenox Avenue
Oakland, CA 94610-4675
<Membership@namyco.org>

Otherwise—you may not be getting your newsletter for a while. Each issue, several *Mycophiles* are returned as undeliverable because of no forwarding address on file. NAMA is charged ***seventy cents*** for each returned or forwarded newsletter.

NAMA is a 501(c)(3) charitable organization. Contributions to support the scientific and educational activities of the Association are always welcome and may be deductible as allowed by law. Gifts of any amount may be made for special occasions, such as birthdays, anniversaries, and for memorials.

Special categories include
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The Mycophile is published bimonthly by the North American Mycological Association, 6615 Tudor Court, Gladstone, OR 97027-1032.

NAMA is a nonprofit corporation; contributions may be tax-deductible.

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Eagle Hill Field Seminars
Steuben, Maine

The Eagle Hill Field Seminars are set in the woods with good facilities, great food, fantastic teachers, and a very intensive teaching program. Along with numerous other ecology seminars, this year's schedule includes five of interest to mycophiles:

May 29–June 4
Lichens and Lichen Ecology—Dr. David Richardson

June 12–18
Taxonomy and Biology of Discomycetes—Dr. Donald H. Pfister

July 10–16
Crustose Lichens of Coastal Maine—Dr. Irwin M. Brodo

July 17–23
Ground-inhabiting Lichens: *Cladonia*, *Stereocaulon*, and other Genera—Dr. Stephen Clayden

Aug 28–Sept 3
Mushrooms for Naturalists—Dr. Rosalind Lowen and Dr. Lawrence Leonard

For further information see the web site www.eaglehill.us or email them at <office@eaglehill.us>.

Delta Institute of Natural History
Bowdoin, Maine

Three courses for mycophiles:

July 16–18
Lichens, with instructor Irwin Brodo.

August 7
Edible Wild Plants and Mushrooms, with instructor Russ Cohen.

September 23–25
Mushroom Identification from *Agaricus* to *Xylaria*, with instructor Gary Lincoff.

For more information or to register, contact Delta Institute of Natural History, 219 Dead River Road, Bowdoin, ME 04287; www.vfthomas.com/deltahome.htm; or phone (207) 266-5748.

NAMA Annual Foray
University of Wisconsin–La Crosse
July 21–24

I hope everyone's heard by now! If not, loads of details can be found in this issue, the Mar./Apr. '05 issue of The Mycophile, or from the NAMA Web site. Don't forget: our Host Mycologist, Tom Volk, has requested that those arriving early please respect the area and not collect within 20 miles of La Crosse.

Three Exotic Mexican Forays

The Copper Canyon Mushroom Expedition
July 24–31

The Tlaxcala Mushroom Foray
August 28–September 4

The Veracruz Fungi Exploration
October 16–23

For details see the Mar./Apr. '05 issue of The Mycophile, contact the tour organizers, Erik and Gundi, at <gundi@mexmush.com>, or visit www.mexmush.com.

Mycological Society of America / Mycological Society of Japan
University of Hawaii–Hilo
July 30–August 5

The Mycological Society of America (MSA) and Mycological Society of Japan (MSJ) will meet in a joint conference on the University of Hawaii at Hilo campus from July 30 to August 5, 2005. This will be the first time the two societies have met together, and it will be an occasion to celebrate the 50th anniversary of the Mycological Society of Japan. Field trips, symposia, and poster sessions will discuss all aspects of the importance of fungal interactions with plants and animals around the world and especially with humans.

Special sessions will reveal newly described Hawaiian mushrooms and other fungi, as well as the most recent technology on how to grow mushrooms commercially and how to extract unique pharmaceuticals from fungi. The Japanese will bring new and exciting information on medical and industrial mycology occurring in Japan. The meetings will provide an ideal atmosphere for American and Japanese scientists to exchange ideas and technology and to forge collaborations for the future.

For more information, contact <fungus@hawaii.edu> and supply an e-mail address where future meeting announcements can be sent, or visit the MSA Web site at www.msafungi.org.

Samuel Ristich Foray
August 11–14

In August of this year, NEMF 2005—the 11th Annual Samuel Ristich Foray—will transform the Mont Alto campus of the Pennsylvania State University into *Mushroom Heaven*.

Situated in the 85,000-acre Michaux State Forest, the school is located near to a wide variety of habitats that ensure some of the best mushroom picking in south-central Pennsylvania. NEMF fungiphiles will channel the area's

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Forays and Announcements, cont. from page 3

tremendous diversity of mushrooms into a spectacular display in the Great Exhibition Hall (a.k.a. the school gym).

Your hosts—the Eastern Penn Mushroomers (who hold their annual Helen Miknis Foray at this site every year), the New Jersey Mycological Association, and the Western Pennsylvania Mushroom Club—will do their best to ensure a most enjoyable shrooming experience.

In addition to mycological interests, your family members will find a multitude of recreational opportunities, including eleven golf courses and easy travel to several important Civil War battlefields (Gettysburg, Antietam, and Harper's Ferry). Chambersburg, PA, Waynesboro, PA, and Hagerstown, MD, offer a variety of accommodations nearby, should dormitory living not suit your style.

There will be lectures and workshops all day Friday and Saturday, as well as many forays to choose from. Each Northeast Foray is unique, with its own strengths and distinctions.

This year we've worked hard to compile an exceptional faculty roster. Popular, eminent, and friendly mycologists who've been regular guests of honor at prior NEMFs include Sam Ristich (our mycological patron), Doug Bassett, Ernst Both, Glenn Freeman, Gary Lincoff, Rosalind Lowen, Walt Sturgeon, Rodham Tulloss, John Plischke III, and Tom Volk.

Less familiar faces (to some) include two renowned European mycologists—Roy Watling (appointed an M.B.E. by the Queen of England for his broad contributions to mycology) and Bart Buyck (Curator of Cryptogamy at the National Museum in Paris, and world expert on *Russula*)—as well as Roy Halling (Curator of Mycology at the New York Botanical Gardens, and currently specializing in Boletes), and Coleman McCleneghan (*Pholiota* specialist, and chief mycologist at the 2004 NAMA).

And we haven't even listed the array of dedicated experts from the three host clubs, or the Mont Alto professors who will introduce us to the local flora!

This year's foray will be limited to 200 participants, on a first-come, first-served basis. There is no membership requirement. Early-bird registration (before July 1st) saves $30. For registration form and additional information email the registrars John or Cheryl Dawson at <nemf2005@suscom.net> or call them at (717) 846-1225.

Telluride Mushroom Festival
Telluride, Colorado
August 18–21

This year is the 25th anniversary of the annual Telluride Mushroom Festival—designed for people interested in edible, psychoactive, and poisonous mushrooms—will be held in Telluride, CO, August 18–21, 2005.

The festival includes mushroom lectures, forays, hands-on identification and cultivation workshops, mushroom poetry, and a mushroom parade that runs down the main street of Telluride and features festival participants dressed as mushrooms, spores, and other elements of the mycological world.

The Festival's annual Mushroom Cook-off Feast features chefs from Telluride's top restaurants, who will prepare mushroom dishes to be judged by festival faculty. The winning chef will receive a chef's hat adorned with mushrooms, and festival goers will dine on the mushroom dishes.

Experienced guides will lead daily fungus forays in the forests surrounding Telluride, generally productive of a wide variety of wild mushrooms, particularly edible species like chanterelles and porcini.

Nationally recognized authorities on mushrooms will present lectures and workshops: Gary Lincoff, past President of NAMA, on "Mushroom Identification"; Paul Stamets, President of Fungi Perfecti (www.fungi.com), on "Medicinal Mushrooms"; Manuel Torres, author, on "The Use of Visionary Mushrooms and Plants in the Americas"; and Dr. Emanuel Salzman, cCo-editor of *Mushroom Poisoning*, on "Mushroom Poisoning."

Complete information about the Festival program, registration, lodging, and travel is available on the Festival's Web site: www.shroomfestival.com; or write Fungophile, attn. Mushroom Festival, P.O. Box 480503, Denver, CO 80248-0503; or call Emanuel Salzman, MD at (303) 296-9359 or (303) 296-1524.

28th Clark Rogerson Foray
Moodus, Connecticut
August 25–28

The foray will be held at Cave Hill Resort, in Moodus. Foray experts will include Gary Lincoff, Roz Lowen, Sam Ristich, Sandy Sheine, and Leon Shernoff. For details see the Mar./Apr. '05 issue of The Mycophile or contact Don Shernoff at (914) 761-0332 or <donshernoff@yahoo.com>.

Foray Newfoundland and Labrador 2005

Gros Morne National Park, Newfoundland
September 2–5

Labrador Straits, coast of the last frontier
September 6–9

The Humber Natural History Society is the host of the 2005 Newfoundland and Labrador Mushroom Foray. The foray is held at Killdevil Lodge in Gros Morne National Park, a UNESCO World Heritage Site. Exotic boreal mushrooms, excellent guest and local faculty, full scientific program, friendly people, stunning natural settings, determinations

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Greetings from Wisconsin, where the weather has finally begun to warm (in time for the morel season, hopefully) and where conditions will continue to improve until we hit a crescendo around mid July. Just in time for the Annual Foray, where I hope to see all of you!

More on the Deadly Japanese *Sugihiratake* Story: Clues to Cause of Mystery Brain Fever

You may recall reading in the last issue of THE MYCOPHILE (Mar./Apr. '05) about some recent deaths in Japan following a rare "brain fever" of kidney patients after the consumption of wild mushrooms. The deaths were a mystery, as the cause—a kind of oyster mushroom known locally as *sugihiratake*, or "Angel Wings"—has long been consumed there as a safe edible species.

A recent report in the Japanese newspaper *Yomiuri Shimbun* may provide clues that lift the veil on this mystery. Tomihisa Ota, a scientist specializing in natural products chemistry at the School of Natural Sciences and Technology of Kanazawa University, has found that when mice are injected with an extract of the *sugihiratake* mushroom, they suffer a toxic reaction that causes kidney failure. Not exactly the effect you want your wild mushrooms to have on your body!

The research team, led by Professor Ota, obtained the extract by heating *sugihiratake* gathered last autumn in Tohoku and Hokuriku Prefectures (Japan) to 90° C for 30 minutes. The team injected mice with one milligram of extract per gram of body weight. Seven of the ten mice injected died within 24 hours. The mice are suspected to have died of shock caused by damage to red blood cells and kidney failure. The toxic effects were not seen in extracts heated to boiling (100° C).

Interestingly, the mushroom is often prepared by boiling in miso soup, which may provide a detoxifying effect. According to Prof. Ota, a toxic sugar protein that is not destroyed by heating the mushroom to the temperature of miso soup was suspected of being contained in the mushrooms or in organisms attached to them. It is possible that the toxic substance enters the bloodstream, destroys red blood cells, and produces a toxic effect, Ota said.

The *sugihiratake* mushroom is probably better known in North America by its scientific name, *Pleurocybella porrigens*. If that doesn't ring a bell, look for pictures of this mushroom within this issue.

Speaking of Mushroom Poisonings: NAMA Members Inform about Poisonous Mushrooms

The most ambitious project ever attempted to inform poison control centers about poisonous mushrooms has been undertaken by Orphan Medical in conjunction with four NAMA members. The result of this project is a 2005 calendar meant for distribution to poison control centers across the country.

The calendar shows many poisonous mushrooms with which people might get in trouble, and it is hoped that this information will help centers to be more aware of these mushrooms. A brief description is included with each picture. The program organizer, John Trestiall, had four pictures used in the calendar; Taylor Lockwood had one; Bill Roody had one; and John Plischke III had 17. Thanks, by the way, to John Plischke for this information.

Anyone wishing to learn more about the calendar or how to obtain one should contact the Western Pennsylvania Mushroom Club, Toxicology Chair, at 1-888-8-ORPHAN.

Don't Pick Up Hitchhikers—Especially the Fungal Type!

Speaking of NAMA members, I recently saw a blurb in *Inoculum* [56(2):15] submitted by our own Jim Trappe regarding an "Important Notice" sent by the State Farm Insurance Company to policy holders. This term was included:

"The following is added to **When the Physical Damage Coverages Do Not Apply:** THERE IS NO COVERAGE FOR ***LOSS*** TO ANY VEHICLE DUE TO ***FUNGI***. THIS APPLIES REGARDLESS OF WHETHER OR NOT THE ***FUNGI*** RESULT FROM A ***LOSS*** THAT IS PAYABLE UNDER ANY OF THE PHYSICAL DAMAGE COVERAGES. WE WILL ALSO NOT PAY FOR ANY TESTING OR REMEDIATION OF ***FUNGI***, OR ANY ADDITIONAL COSTS REQUIRED TO REPAIR ANY VEHICLE THAT ARE DUE TO THE EXISTENCE OF ***FUNGI***." (Capital letters, italics, and boldface appear as in the original.)

Jim goes on to muse about the damaging affects of overpowering odors from overripe truffles!

I think our readers, during this morel season, should be careful not to overload their cars with too many mushrooms. Rather than risk damage your auto's suspension—which won't be covered by insurance—leave some mushrooms for the next guy!

And Speaking of Jim Trappe . . .

Check out the Jan./Feb. issue of *Audubon* (mine came after the last issue of THE MYCOPHILE had gone to press) which features a handsome photo of Dr. Trappe in his natural habitat: standing in the middle of a forest in the Pacific Northwest and holding a truffle rake. By the way, he's also holding a truffle.

The story, "The fungus among us," features those in the pursuit of

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the Oregon truffle as well as those who swear by its culinary prowess. The North American Truffling Society gets a plug, as do the restaurants that serve up this delectable sporophore. Unfortunately, unscrupulous hunters are overharvesting the truffle because it has become so popular—and forests may be ruined in the process.

For those wishing to try this mushroom in your own kitchen (and residing hundreds of miles from Oregon, as do I), call (888) 465-3247 and a Eugene-based company called MycoLogical Natural Products will FedEx "eco-friendly" Oregon truffles right to your door!

More News from the Old-Growth Forests of the Pacific NW: Medicinal Mushrooms May Counter Smallpox and Similar Viruses

Recent *in vitro* tests demonstrate that a specially prepared extract from *Fomitopsis officinalis* is highly selective against viruses. *Fomitopsis officinalis* is a wood conk mushroom, known for thousands of years as "Agarikon." It is extinct or nearly so in Europe and Asia but is still found in the old-growth forests of the American Pacific Northwest. It may provide novel antiviral drugs useful for protecting against pox and other viruses.

That is the forecast of mycologist Paul Stamets, owner and director of the research laboratories of Fungi Perfecti of Kamilche Point, WA. For the past two years Stamets has prepared more than a hundred strains of medicinal mushroom extracts for testing by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health and the U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID), in their joint biodefense antiviral screening program. The results to date promise breakthroughs on this biomedical frontier.

Dr. John A. Secrist III, Vice-President of Southern Research Institute´s Drug Discovery Division, who oversees an NIAID contract to evaluate potential antiviral drugs, notes that "Several of Stamets's medicinal mushroom extracts have shown very interesting activity against pox viruses in cell culture assays performed through NIAID, and we are hopeful that they will also prove effective in the animal model systems. The number of different classes of compounds that show promising activity is small, so finding something new would be of great benefit to the scientific community."

In fact, of more than 200,000 samples submitted over several years, only a handful are slated for animal testing each year. In the past year, approximately ten samples showed activity warranting approval for animal testing; of these, two are from strains of *Agarikon* discovered by Stamets. Moreover, Mr. Stamets's samples are the only natural products extracts tested through this program that have demonstrated very active anti-pox activity.

The NIH/USAMRIID screening program tests the mushroom extracts against viruses that could be weaponized, including the viruses causing yellow fever, dengue, SARS, respiratory viruses, and pox viruses. Of the *Agarikon* samples submitted to date, several showed potent activity for reducing infection from vaccinia and cowpox, which are in the same family as the smallpox virus.* These extracts show activity against vaccinia and cowpox by two different viral evaluations, demonstrating the reproducibility of the results. Stamets has filed several patents, both U.S. and international, on the antiviral properties of mushrooms in the *Fomitopsis* family. However, only compounds derived using Mr. Stamets's proprietary, patent-pending methodology for cell cultures show activity; simple extracts from the woody conks (such as tea or infusions) are not active. Harvesting these rare conks from the forests will not provide therapeutic benefits and could impair the reproduction of the fungus.

While several strains of extract generated strong anti-pox activity, other strains were less potent. This underscores the importance of conserving mycodiversity. More potent strains may yet be discovered.

As for *F. officinalis,* this mushroom was first described 2000 years ago as an anti-inflammatory medicine by Dioscorides, the Greek physician in his text *Materia Medica.*

"The ecological niche for these unique mushrooms is increasingly jeopardized as humans destroy old-growth habitats," comments Stamets. "As this happens, the pool of available strains will be further reduced. Acquiring as many strains as possible should be an international priority so that preventive or curative medicines against pox and related viruses can be developed. Personally, I believe we should be saving our old-growth forests as a matter of national defense."

[The text above was a press release from Paul Stamets dated March 24, 2005, and was edited for length and clarity.

* Vaccinia is the virus that was used historically to vaccinate against smallpox, or variola virus; it is the source of the word "vaccine." It was long believed to be cowpox virus—"vacca" comes from the Latin word for "cow"—but it is now thought to actually be a hybrid between the two viruses, cowpox and smallpox. It is also worthwhile to remind everyone that smallpox was eradicated from humanity decades ago—the last case was in 1978—and the only samples known to exist are kept "under tight security" in freezers in the US and Russia.—*Ed.*]

More on Mushroom Extracts . . .

Touted as natural immunity boosters, mushroom extracts have thousands of years of anecdotal evidence to support their use, but only recently have they been put to the test in the laboratory. Every month I come across dozens of studies published on this very topic. Most findings remain buried in

Continued on next page

research journals, but a few make it into the mainstream media.

A blurb in *Men's Health* (April 2005) mentions a new University of California at Los Angeles (UCLA) study which showed that a reishi mushroom extract was able to inhibit the formation of blood vessels that feed tumors. "The mushroom approaches are promising," says Andrew Vickers, Ph.D., a researcher at Sloan-Kettering. However, the scientist cautions, "what's effective in the lab does not necessarily help patients."

Beneficial Fungi Could Halt Hopper Hordes

Most of the time I'm featuring stories in the news where fungi are made out to be the bad guy when it comes to diseases of plants. You may recall many such stories on newly emerging diseases like soybean rust and sudden oak death. Well, this time I have good news about some fungi that may someday be the savior of crop plants.

A recent press release from the Agricultural Research Service of the U.S. Department of Agriculture describes two fungi that may represent a natural solution to the problem of millions of grasshoppers leaping across parts of the western United States each summer. Both are like a fatal case of athlete's foot to insects, producing infectious spores that hoppers can pick up on their feet.

Stefan T. Jaronski, an insect pathologist with the Agricultural Research Service, is studying these fungi and other microbes in hopes of keeping soaring hopper populations in check. He works at the agency's Northern Plains Agricultural Research Laboratory in Sidney, Montana.

During outbreaks, which are often driven by droughts, grasshoppers can gobble up valuable crops, forage, and ornamental plants, costing millions of dollars in damage. One fungus, *Beauveria bassiana*, is already registered in the United States for the control of a variety of insects. Once grasshoppers pick up its spores on their feet and other body parts, the fungus grows quickly inside their bodies, usually killing them within a week. Recently, Jaronski found that an effective way to deliver the *B. bassiana* spores and make them attractive to grasshoppers is to mix them with raw canola oil. Black and strong-smelling, the raw oil contains higher concentrations of the fatty acids that the insects find irresistible. It's also cheaper than using refined, store-bought canola oil.

Jaronski envisions the mixture of canola oil and fungal spores being sprayed on targeted strips of rangelands from the air or on the ground. Because the oil attractant lures hoppers to the strips from a wide distance, only small amounts of the fungal spores are needed.

The other fungus, *Metarhizium anisopliae* var. *acridum*, is much more host-specific than *Beauveria*, affecting just grasshoppers and their close relatives. Jaronski's lab has found that *Metarhizium* is very infectious in most American grasshoppers and the Mormon cricket, which also causes destructive outbreaks. Coupled with the raw canola oil carrier, it could also become a valuable tool for controlling grasshoppers.

Tsunami Fungus

From the *New Scientist* [185(2485): 6–11] comes word of a rare but potentially deadly fungal infection that could go undiagnosed in the areas most affected by the Southeast Asian tsunami because many of the local labs capable of detecting it have been destroyed.

A 56-year-old man who returned to Australia from Sri Lanka after being injured by the tsunami was found to have a rare fungal disease, called mucormycosis. This disease, also known as zygomycosis, is a fungal infection of the sinuses, brain, or lungs that occurs primarily in people with immune disorders. It is caused by common fungi frequently found in the soil and in decaying vegetation. Most individuals are exposed to these fungi on a daily basis, but people with immune disorders may be more susceptible to infection.

Conditions most commonly associated with mucormycosis include diabetes mellitus, chronic steroid use, metabolic acidosis, organ transplantation, leukemia/lymphoma, treatment with deferoxamine, and AIDS. If not diagnosed in the early stages of disease, mucormycosis has an extremely high mortality rate even with aggressive surgical intervention. Death rates range from 25% to 80% depending on the site involved as well as the underlying immune problems. But if properly diagnosed, the infection can be treated with cheap antibiotics, says David Meddings, a World Health Organization medical officer working in the disaster zone. He hopes the case will alert local health workers to the possibility that other survivors may have been infected.

Protect Your Clothes with . . . Fungi?

Science News reports that scientists in Austria have created an enzyme treatment to protect wool clothes from shrinkage. Wool fibers are composed of keratin proteins bundled into microfibrils. The fibrils are wrapped in a natural scaly cuticle. When wool is washed, the scales interlock, preventing the fibers from moving freely. This interlocking prevents the fabric from retaining its original size.

There already are shrink-proofing treatments for wool, but they rely on chlorine-based chemicals to remove the cuticle and, as a result, generate wastewater that can be harmful to the environment.

Angelika Erlacher and her colleagues at the Graz University of Technology in Austria decided to find an environmentally friendly route to unshrinkable wool. The team discovered an enzyme in the soil fungus *Beauveria brongniartii* that degrades wool fibers. To ensure that the enzyme wouldn't attack the

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protein fibrils, the researchers attached it to a large polymer that can't penetrate the cuticle. They then soaked the fabric with the polymer-enzyme complex and, after it had partially degraded the cuticle and smoothed it out, washed away the complex. After subjecting their shrink-proof wool textiles to several washing cycles, the scientists found that the treated wool didn't loose any of its volume and was virtually indistinguishable from unwashed textiles. In contrast, untreated fabrics with the same wash regimen were reduced to about half their original size.

When the Crops Tend the Farmer

Leaf-cutting ants are the farmers of the ant world. But unlike real farmers, the leaf-cutters raise only one crop: a strain of fungus particular to each colony. A study published in the journal *Science* [307(5710): 741–45] reports that researchers have figured out why: different strains war with each other, forcing the ants to grow just one.

Leaf-cutting ants have been cultivating fungi for millions of years. The benefits are mutual: Ants nourish the fungi with pieces of leaves and defecate on them to provide other nutrients. In turn, the fungi flourish and are carried far and wide by virgin ant queens when they leave to build a new colony. But each colony deals with only one strain of fungus, and scientists didn't understand why or how this was.

Evolutionary biologist Michael Poulsen and fellow researchers at the University of Copenhagen, Denmark, took a crack at the mystery by observing the fungus gardens of 18 ant colonies. When they placed ant feces from one colony onto the fungus of another, the fungus became discolored and grew slower. In addition, when ants from one colony were fed fungi from another, their feces caused a similar reaction on their own fungi. This did not happen when they were fed fungus from their own garden. These findings led the researchers to suspect that compounds specific to the foreign fungus were inhibiting the growth of the in-house fungus.

"This makes it necessary that ants rear clones of the same fungi," says Poulsen. Otherwise, the competition would stunt fungal growth and reduce the ants' food supply. So in terms of farming, says Poulsen, it's really the fungus that's running the show.

"This is a great advance," says Ulrich Mueller, an evolutionary biologist at the University of Texas at Austin. "We usually think of a mutual relationship as one in which both partners gain and there is no internal conflict. But this paper elegantly shows there can be a relationship even with the conflict."

And now, a quick scan of the pages of *Mycological Research* . . .

The year 2004 marked the 100th anniversary of the founding of the Fungal Diversity Center in the Netherlands, heralded as the "oldest collection of living fungi in the world." Mathew J. Ryan and David Smith provide a timely review [108(12): 1351–62] of these valuable facilities around the globe, titled "Fungal genetic resource centers and the genomic challenge." Their article considers the impact of such centers, the current roles of fungal genetic resource centers, the mechanisms used to preserve organisms in a stable manner, and the range of resources that are offered for genomic research.

The same issue has a study looking into the plight of an Australian mycophagous marsupial known as the bettong. Vernes et al. [108(12): 1438–46] have found that fire-related changes in the biomass of hypogeous sporocarps can pose dire consequences for the little mammal. Interestingly, the bettong is an endangered marsupial that inhabits the woodlands of northeastern Australia and is quite fond of fungi. In fact, the furry mycophile utilizes at least 35 hypogeous species that comprise 33% to 67% of its diet, depending on season and habitat.

Wei, Yao, Wang, and Pegler [108(12): 1458–62] describe a newly discovered species of *Termitomyces* mushroom from China, with a key to allied species. The "new" species was collected from Chinese fresh produce markets where it's been found for years as a choice wild edible!

Get Involved!

Michael Kuo (you may have visited his fabulous Web site, www.mushroomexpert.com) is working on a project with Nik Money and Rodham Tulloss to determine the distribution of *Amanita thiersii.* This shaggy white species is found in lawns and was originally described in Texas. Over the past two decades, the mushroom appears to be spreading northward and eastward.

If anyone has seen this species, you can assist in ongoing research by contacting Dr. Kuo at <cystidium@yahoo.com>. Incidentally, Michael has a book entitled *Morels* coming out in October 2005. For a sneak peak, visit his Web site.

Limerick

by Charmoon Richardson

I once met a bolete that spoke.
He enjoyed surprising the folk.
He'd say "Look over here,"
Until one day a deer
Ate him up—that's the end of this joke.

Reprinted with permission from *SOMA News* (Sonoma County Mycological Association) and the author. For more mushroomy limericks and other fun things, write to Charmoon Richardson, The Wild About Mushrooms Co., P.O. Box 1088, Forestville, CA 95436, or check out her Web site at www.wildaboutmushrooms.net.

Poisonings, cont. from page 1

The overwhelming majority of reports received over the past year have again come via the work of Marilyn Shaw, of Denver, CO. Most of her reports result from her close cooperation with the Rocky Mountain Poison and Drug Center (RMP&DC). She also talks frequently with people involved in the poisonings in order to identify the mushrooms as accurately as possible, to obtain detailed information on symptoms experienced, and to try to determine what led to the ingestion.

Hanna Tschekunov provided reports from calls to the Florida Poison Information Center Network.

Judy Roger investigated mushroom poisoning reports from the Oregon Health Sciences University, Oregon veterinarians, and from the Oregon Mycological Society Website. Judy regularly went to the site of the poisoning to collect mushrooms and often was able to do microscopy from the vomitus of the victims to positively confirm most of her identifications.

Raymond Archambault provided information about poisonings in the Québec area. Additional reports were received as a result of concerned individuals locating the NAMA Web site or contacting the author through his mushroom Web site (www.evergreen.edu/mushrooms).

All confirmed deaths of humans were from eating members of the "Destroying Angel" group of *Amanita*. One death reported from Minnesota was due to ingesting *Amanita bisporigera,* one from Québec due to *Amanita virosa,* and one death reported from California as a result of eating *Amanita phalloides.* These mushrooms contain amatoxins.

There may also have been a death due to kidney failure from a man in California collecting "Boletes."

Eight dogs died or were euthanized after mushroom consumption. In the dog fatalities *Inocybe* species were confirmed in about half of the cases and *Amanita* species in the other half.

It is important to note that at least eleven or twelve Asian immigrants mistakenly consumed either *Amanita phalloides* or *Amanita bisporigera* (cases in Oregon, California and Minnesota). Several other poisonings also involved recent immigrants from various parts of the world where mushroom collecting is practiced. There is clearly a need to find a way to educate recent immigrants about dangerous lookalikes to mushrooms that they are familiar with from their home country.

In one incident seven Korean immigrants stated that they thought they had consumed a *Volvariella.* In many Asian countries, the choice "paddy straw mushrooms" (*Volvariella* spp.) are abundant. These pink-spored mushrooms look very similar to the white-spored "Destroying Angels," especially when they are young and the pink spores are not yet in evidence. In addition to a difference in spore color, the *Volvariella* species lack a partial veil.

In the past Italian immigrants have consumed *Amanita phalloides*, mistaking it for the choice edible "Coccora," another *Amanita* with a distinct cup-like volva. While *usually Amanita phalloides* is greenish and "Coccora" is yellowish, both can be rather white at times. One person who likes to eat *Amanita vaginata* got *Amanita phalloides* instead.

This past year, at least 22 people mistook *Amanita pantherina* and *Amanita muscaria* for an amazingly wide range of edible mushrooms. Two couples, one in Washington and one in Montana, ate young *Amanita muscaria,* thinking they were eating puffballs. Remember—edible puffballs are pure white inside and soft like a marshmallow.

Four people mistook *Amanita muscaria* for Matsutake, and two people ate *Amanita pantherina* thinking that it was Matsutake. If they had used their noses to seek out the delightful cinnamon spice/dirty-sock smell of Matsutake, and their sense of touch to squeeze the uncrushably dense flesh of Matsutake, they would not have gone wrong.

A group of six thought that they were eating "Shaggy Manes"! One person thought that she had "After-the-Rain Mushrooms." In many cases we have no idea what the victims thought they were eating. What the 27 dogs thought they were eating is anyone's guess.

As usual, *Chlorophyllum molybdites* claimed a significant number of unwary victims. Indeed, I suspect that many of the fifteen "unknown" poisonings reported from Florida were due to ingestion of *Chlorophyllum molybdites.* Since this lawn mushroom is common in warm humid areas, and since it is big and meaty with a good flavor and closely resembles the "Shaggy Parasol," it frequently gets the attention both of young children and of adults who should know better. The symptoms are always severe gastrointestinal distress. However, the onset is sometimes delayed as long as six hours, causing real panic in Poison Centers since delayed onset of symptoms is characteristically associated with the deadly mushrooms.

In the fall of 2004 at least thirteen deaths were reported in Japan, all associated with the consumption of *Pleurocybella porrigens,* "Angel's Wing." All the individuals who died (of an acute brain condition) had kidney disorders. Since Angel's Wing is common in the United States, it is important to alert mushroom pickers to its potential danger to people on dialysis, though whether it was the mushrooms themselves or some contaminant in Japan remains to be researched.

Meanwhile, I have no record of this species ever causing a poisoning in North America. I have eaten it occasionally and have once or twice served it to my mycology students over the years, but it is not that great-tasting. Just to be safe, it is now off my list.

In a number of cases, the poisoning involved a popular edible species. Most of these cases are

Continued on page 10

Poisonings, cont. from page 9

examples of individual food sensitivities. However, as in years past, five people became ill after eating morels—some in association with alcohol, but some where no alcohol was involved and the mushrooms were thoroughly cooked.

In some of these cases "False Morels," which I presume to be either *Verpa bohemica* or *Gyromitra esculenta,* are suspected. There is actually a significant commercial market for *Verpa bohemica* and many people relish eating it! Others react strongly to *Verpa* spp. and/or to *Morchella* spp.

There were also two reports of poisonings from consumption of the choice edibles *Cantharellus formosus* and one human and one dog report from *Tricholoma nudum.* Members of the *Armillaria mellea* complex growing on conifers also caused several poisonings. *Boletus edulis* caused gastrointestinal distress in one couple. *Leccinum manzanitae* caused one case of GI distress in California and an unidentified *Leccinum* was implicated in a severe case of stomach cramps in Oregon. *Lentinula edodes* purchased from a store resulted in a severe poisoning and coma for one person. Two people had adverse reaction to consumption of *Leucoagaricus leucothites*, a mushroom that I don't recommend eating in any case because it looks so much like a "Destroying Angel" if someone cuts the stem off and misses the buried volva of the *Amanita.* A man from Wisconsin reported a case of severe contact dermatitis (poison ivy-like) from consuming *Laetiporus sulphureus*. That brave soul confirmed his suspicions by eating a small amount of the "Sulfur Shelf" a second time and suffering a milder repeat of the symptoms.

The committee also saw a much larger than usual number of reports (16) of ingestion of hallucinogenic mushrooms where the individual suffered a bad trip and wound up in the hospital. One person reported adverse effects that persisted for months after ingesting a hallucinogenic species. A group of three teenagers purchased "hallucinogenic" mushrooms but got taken by consuming some "raw shredded brown mushrooms" that produced vomiting and diarrhea along with tachycardia and a big hospital bill but no hallucinations. While most of the intestinal ingestions of hallucinogenic mushrooms involved teenagers and young adults, there were also reports of people from their 40s through 60s trying the magic mushrooms.

Of the over 50 dogs made ill by mushrooms, either *Amanita muscaria* or *Amanita pantherina* was implicated in over half of the cases. In one case a dog was euthanized when it went into the coma typical of this kind of ingestion. We suspect that had the vet waited, the dog probably would have recovered, unless it was otherwise in very poor health. At least eight dogs consumed *Inocybe* species. Judy Roger confirmed by study of the vomitus that *Inocybe geophylla* or *Inocybe lilacina* were involved in two of three lethal cases. At least three dogs died from suspected mushroom ingestions where no expert had the chance to determine the mushroom involved.

If you hear of mushroom poisonings in the future, you are encouraged to go to the NAMA Web site (www.namyco.org) and file a report. These reports will help us to better understand what mushrooms should be avoided and what to expect from a specific mushroom ingestion.

Also, lest this report leave you too depressed, remember that mushrooms in general are far less toxic than plants. Unlike plants, no mushroom is so poisonous that you cannot handle it safely. Of the thousands of species of mushrooms out there only a handful are deadly. All that is needed is a little better education. Most people would never dream of randomly eating any wild plant they find (or for that matter any bulb that they might dig up in their flowerbed; but for some reason, once they get the nerve to try wild mushrooms, people often proceed with inadequate information. Help us change that situation.

[*All readers would benefit from a visit to Dr. Beug's terrific Web site, www.evergreen.edu/mushrooms.*]

Forays & Announcements, cont. from page 4

backed by photo and voucher specimens. Information, agreement, and registration forms, reports of 2003 and 2004 forays, species lists, and other information are available and/or downloadable at Humber Natural History Society Web site: www.swgc.mun.ca/hnhs.

Gary Lincoff Mid-Atlantic Mushroom Foray
September 10

This annual event, billed as the "nation's largest fall foray," is hosted by the Western Pennsylvania Mushroom Club. Scheduled presentations feature Gary Lincoff, special guest mycologist Walt Sturgeon, special guest mycologist Dr. Ernst Both, and several other mycologists, plus a large mushroom-tasting event (last year's menu included more than a dozen items!).

The cost for the entire day's events is still just $50—what a bargain! Children 11 and under are free!

Registration is limited; the last two years were sold out early, and people were turned away. Contact the WPMC or Dick Dougall (412) 486-7504, or by email <rsdme @imap.pitt.edu>; or Glenn Carr (412) 369-0495, or by email <gbrown2carrs@cs.com>.

Wildacres Regional NAMA Foray

Wildacres, North Carolina
September 29–October 2

Dr. Orson Miller, Jr., will be Principal Mycologist. Participants at this foray will be limited to 40 persons, double-occupancy. There are no private rooms. The cost of the foray is $175 and covers three nights lodging and eight meals beginning with an evening meal on Thursday September 29 and ending with breakfast on Sunday, October 2. For information contact Allein Stanley at <wildacres@namyco.org>.

3rd International Medicinal Mushroom Conference

Port Townsend, Washington
October 12–17

As sources for new antibiotics (both antibacterial and antiviral), immunomodulators, enzymes, enzyme-inhibitors, and other medicines, mushrooms play a unique role in complementary therapies. Join the leaders in this field at IMMC3 to explore the most recent innovations in medicinal mushrooms.

The conference will be held in the conference center at the historic Fort Worden near Port Townsend, WA, on the eastern edge of the Olympic Peninsula. The close proximity to virgin old-growth forests will provide a unique opportunity of foraying into some of the most ancient woodlands of the world. The timing of the conference has been selected so that the wild-mushroom season will be at its peak. This event promises to be not only academically interesting, but also visually and empirically rich. We promise an unforgettable experience and hope you will join us in helping to make this conference a success.

Fungi Perfecti, L.L.C., will be hosting pre-conference mushroom forays into the old-growth forests of the Olympic Peninsula on October 10th and 11th. These expeditions will be led by professional mycologists with extensive knowledge of the native Northwest mushroom species. Persons wishing to attend the IMMC may register through Fungi Perfecti via the mail: Fungi Perfecti, L.L.C., P.O. Box 7634, Olympia, WA 98507; via phone at (800) 780-9126 or (360) 426-9292; or via fax at (360) 426-9377. An online registration form is available for those purchasing their registrations via the Online Store using a credit card. (You can also use the online form to simply register for the next round of information concerning the conference). Or you can register via the mail with a credit card, check or money order using a downloadable registration form.

Registration fee for the conference is $500.00 for check or money order transactions, $510.00 for credit cards, and $530.00 for bank wires. This fee does not include food or lodging.

A limited number of discounted student registrations will be made available in due course. Conference attendees may reserve lodging in a variety of dormitories and houses at the Fort Worden Conference Center through Fungi Perfecti. Housing is assigned on a first-come, first-served basis. All housing costs include sales tax, linen service and at least one meal per day (dormitory housing includes two meals per day). To make reservations or for more information, contact Steve at (800) 780- 9126 ext. 10, or email at <immc@fungi.com>.

8th International Mycological Congress

Cairns, Australia
August 21–26, 2006

It's not too early to start planning—and saving money—for IMC8. Details forthcoming; meantime check the Web site for periodic updates: www.sapmea.asn.au/imc8.

Mushroom Art

Renowned artist Alexander (Sasha) Viazmensky's mushroom art will be displayed at the Oxford Ashmolean's exhibition "1000 Years of Botanical Art" from May 2 to September 11, 2005—see details at www.ashmol.ox.ac.uk/ash/exhibitions/exh075.html.

Guest curator Dr. Shirley Sherwood chose the exhibits from her acclaimed collection of botanical painting by artists worldwide and from the rich historical treasures of Oxford's libraries and museums. Alexander Viazmensky's mushroom art is in the catalog of the exhibition *A New Flowering: 1000 Years of Botanical Art* by Dr. Shirley Sherwood, 200 pp; paperback; 2005; ISBN 1-85444-206-6. Send inquired to <publications@ashmus.ox.ac.uk>.

If you can't make the trip, you can view Alexander Viazmensky's new mushroom prints (which are fairly priced for sale) at: www.pelcor.com/mushrooms/SashaMushrooms.html. The paintings of *Amanita muscaria* are incredible—possibly more beautiful than the actual mushrooms!

Books for Sale

Martin, G. W., and C. J. Alexopoulos. *The Myxomycetes.* Univ. of Iowa Press, 1969. 560 pp. (41 color plates). Mint cond. $150.00 + shipping. Contact Larry Littlefield, 2724 Black Oak Drive, Stillwater, OK 74074, or <larrylittlefield@cox.net>.

Rare Books on Fungi and Lichens

Looking for rare and out of print texts on fungi and lichens? Many titles printed during the 18th through early 20th centuries can be found through Antiquarian Steven Ekholm. Famous authors such as Elias Fries, Robert E. Fries, Karl Starbäck, and Juel are represented, among many others. All original publications!

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Why Do Mushrooms Come in a Wide Variety of Shapes and Colors?

by Dennis E. Desjardin, Ph.D.
(Reprinted with permission from the Mycological Society of San Francisco's *Mycena News*.)

Mushrooms are the charismatic reproductive structures of individuals whose main body (the potentially immortal hyphae) is well hidden in the soil or amongst leaves and rotting wood. Although there are many ecologically important roles for the hyphae, the primary role of the mushroom is reproduction. Hence, they are optimally designed for abundant spore production and effective spore dispersal, and their shape reflects this function.

One strategy is to produce and disperse billions of spores quickly, so the mushroom is designed to develop rapidly (in one to seven days) and to have a maximized surface area for spore production. There are many ways to design a large spore-bearing surface area, and mushroom species exhibit them all. Underneath a cap that provides a structural foundation and protection for the developing spores, some mushrooms produce radiating plates called gills on which the spores are formed ("agarics," like portabella). Other species form a sponge-like structure of vertically oriented tubes inside which the spores develop ("boletes," like porcini), while others form spine-like spore-bearing structures (tooth fungi, like hedgehogs).

In most of these mushrooms, the spores are forcibly discharged, so the cap is elevated by a stem to assure that the spores are released into the air for effective dispersal. Rather than produce a cap and stem, some mushrooms look like marine corals with highly branched, erect fruitbodies. In these coral mushrooms, the spores are produced all over the surface of the branches: again, an effective structure for maximized spore production. These quickly formed fleshy mushroom species soon become fodder for myriad arthropods, mollusks, and other animals, thereby serving an important role in the food web.

A different strategy is to produce mushrooms that live longer and release their spores slowly over weeks or months. These mushrooms are designed to avoid predation and to withstand environmental pressures encountered over long periods. Polypores and other bracket fungi can be seen all year long because they form their mushrooms from very thick-walled cells that inhibit bacterial growth and animal predation. Yet other mushrooms form their billions of spores inside an enclosed structure that opens only at maturity, and, with the aid of splashing rain and plodding animals, they slowly "puff" their spores into the air (puffballs).

Interestingly, these different mushrooms shapes have evolved independently many times, indicating that not all mushrooms are closely related to each other. Some gilled mushrooms are more closely related to boletes, polypores, or puffballs than they are to other gilled mushrooms. The repeated evolution of similar morphologies (convergence) is a good clue to their adaptive significance. Most of the adaptive features of mushrooms that aid in their survival and success are physiological or microscopic and are not seen easily. Toxins, distasteful compounds, anti-freeze, hydrophobic tissues, sticky residues, and hooked or needle-shaped cells are some examples.

Concerning color variability, in many cases mushrooms are brightly colored to attract spore dispersers, analogous to brightly colored fruits attracting seed dispersers. Stinkhorns are some of the most unusual mushrooms known, suggesting props from the X-files. They are often bright red and oddly shaped, like starfish, phalluses, or whiffleballs. Both color and shape are visual attractants for insects. Moreover, as their common name implies, they produce foul volatile compounds that smell like dead and rotting flesh. The strategy for stinkhorns is to attract flies, which eat the slimy, nutritious spore mass, fly off, and defecate in a new location where the spores then germinate in a nitrogen-rich substrate. Stinkhorn spores are adapted to pass through the digestive system of insect where the insect's enzymes may even aid in spore germination. The fly benefits from this, too, in having food to eat and in providing food for its progeny, who consume the stinkhorn.

In a few cases, mushroom colors may serve as warning coloration like that seen in poison dart frogs and coral snakes. Some mushrooms with unpalatable or toxic compounds are distinctively colored and may serve as a warning to potential predators. Avoiding predation is important to mushrooms only when they are young, before the spores are formed. Remember, when a mushroom is mature, it has already dispersed millions to billions of spores and has effectively served its purpose. If an animal eats it at maturity, the animal becomes an additional dispersal vector for the fungus. Here, then, being brightly colored to attract animals is beneficial even though the mushroom is consumed.

Who knows, maybe mushrooms come in fantastic shapes and colors just to enhance the aesthetics of this planet, thereby making us happier and more conservation centric: the altruistic mushroom.

Dr. Desjardin is the Professor of Mycology at San Francisco State University and the author of numerous research papers on fungi. He is currently working on the fungal flora of the Hawaiian Islands and Indonesia.

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P.S. How did you hear about Mushroom the Journal?

On to Wisconsin, continued from page 1

will be visiting, but also for the many attractions of the upper reaches of the river and the city of La Crosse. An additional plus is a live band on Saturday night. Bring your dancing shoes!

You may reach La Crosse (LSE) by Northwest Airlines from Minneapolis/St. Paul, MN (MSP), American Airlines through Chicago (ORD), or by Midwest Express through Milwaukee (MKE). Madison, WI, is about 120 miles from La Crosse, and Minneapolis about 135 miles if you would like to drive from these cities. We do plan a shuttle from the La Crosse airport to campus.

Additional rooms have been reserved in two downtown hotels that front on the Mississippi River. They are being offered at the government rate of $92.00 per night, double occupancy, with a 12.5% tax. If you prefer these accommodations, you may contact the hotels directly:

Courtyard by Marriott
500 Front St.
La Crosse, WI 54601
(608) 782-1000

Radisson Hotel
200 Harborview Plaza
La Crosse, WI 54601
(608) 784-6680

Check out Tom Volk's Web site for more information about our venture into this great new territory: TomVolkFungi.net at his NAMA 2005 page.

[*Editor's note: Tom Volk has requested that those arriving early please respect the area and not collect within 20 miles of La Crosse.*]

NAMA Voucher 2004-347, *Amanita ravenelii.* Identified by N. Jay Justice and collected by John Ellifritz on the University of North Carolina campus under pine trees during last year's Annual Foray in Asheville, NC.

Fungi in Forest Ecosystems: Systematics, Diversity, and Ecology. Memoirs of the New York Botanical Garden, Volume 89, 2004. Cathy L. Cripps, ed. ISBN 0-89327-459-3.

At the joint NAMA/MSA Foray in Asheville, NC, last July, a celebration was held honoring the career of mycologist Orson K. Miller, Jr. At that banquet, the following letter from NAMA was read:

On this festive evening the officers and members of the North American Mycological Association are pleased to join in the celebration of the mycological career of Dr. Orson K. Miller, Jr. For nearly 40 years Orson has been a critical link between the professional and amateur mycological communities and the person most responsible for helping amateurs develop a deeper understanding of mushrooms. For instance, he

- *First and foremost has been a patient, understanding, and effective teacher in the field, in the lab, and around the display tables.*
- *Wrote one of the first well-illustrated color mushroom guides—Mushrooms of North America—an excellent book that unfortunately no longer is in print.*
- *Has been NAMA's most active institutional trustee, attending many annual meetings, offering advice, serving on committees, and on occasion providing a calming influence when tensions ran high.*
- *Has served as mycologist—chief, staff, and volunteer—at NAMA forays too numerous to list, beginning in 1966 at Priest Lake, ID, and stretching to this year's event here in Asheville. He also has found time to head up many local and regional forays from Los Angeles to southern Idaho to New Mexico to Wildacres in the nearby Blue Ridge Mountains.*
- *Mentored many of the current generation of mycologists and encouraged them to continue the tradition of interacting with amateurs that he inherited from his own advisor, Alex Smith.*
- *Led successful NAMA international forays to Scandinavia (1978), Austria-Yugoslavia (1980), and Czechoslovakia (1983), arranging for interactions with many prominent European mycologists in the people-to-people spirit that was at the heart of NAMA's origins in the Eisenhower years.*
- *Taught, for many years, a very popular summer mushroom class at Flathead Lake, MT, including one in association with the 1973 NAMA foray there.*

In recognition of these and many other activities, in 1981 Orson received NAMA's highest honor—the Award for Contributions to Amateur Mycology.

Before going further, we would be remiss not to acknowledge the other half of Team Miller—Orson's wife Hope. Orson usually gets top billing, but all who know them recognize that their successes come from a joint effort. Although many of us are well aware of Hope's considerable skills in cooking with mushrooms, her organizational talents, wealth of knowledge about mushrooms, and tolerance of Orson's habit of starting work earlier in the morning than anyone ought to should not be overlooked.

In closing, NAMA's members past and present join with Orson's many friends and colleagues throughout the world in congratulating him on a remarkable career, thanking him for all he has done on behalf of NAMA and amateur mycology, and wishing him the very best as he continues his mycological endeavors at the informally named McCall Center for Mushroom Research.

Thank you, Orson.

• • •

During the festivities *Fungi in Forest Ecosystems,* which is dedicated to Orson, was unveiled. The cover describes the volume as "a compilation of research from around the globe that documents a diversity of fungi and the critical roles they play in forest health and function." The topic for the book was selected to recognize both Orson's early career as a forester and his life-long passion for the higher fungi.

Edited by Cathy Cripps, the book contains 28 contributions from 56 of his students and other colleagues from throughout the world, from Scotland to Switzerland, New Guinea to India, and Costa Rica to Korea. As the title suggests, the chapters are organized into three main sections: Systematics, Diversity, and Ecology. These follow a recounting of Orson's life and especially his mycological career, accompanied by a list of student theses completed under his guidance, a list of his published fungi, and a bibliography of his many books and articles. Among the interesting tidbits exposed are Orson's stints as poster supermodel for the Girl Scouts of America and his illustrious—albeit brief—television careers.

The Systematics section includes 11 chapters, ranging from "*Amanita* subgenus *Lepidella* and related taxa in the southeastern United States," "Two remarkable taxa of *Crepidotus* from Bonin Islands (Japan) and new records from the Hawaiian Islands and Papua New Guinea," "New species of lignicolous basidiomycetes from Hawai'i," to "Three new boletes for Costa Rica." The inclusion of papers dealing with the Svalbard Archipelago and New Zealand's sub-Antarctic islands suggests that "forest ecosystems" was interpreted broadly.

Hope Miller, Orson Miller, and Cathy Cripps

The Diversity section consists of only six chapters: "Subalpine conifer forests in the Alps, the Altai, and the Rocky Mountains: A comparison of their fungal populations," "Ectomycorrhizal epigeous basidiomycete diversity in Oregon Coast Range *Pseudotsuga menziesii* forests: Preliminary observations," "Biodiversity of wood-inhabiting fungi in Israeli pine forests," "Distribution and ecology of myxomycetes in southern Appalachian subalpine coniferous forests," "Macrolichens of the forests of Montana and Yellowstone and Glacier National Parks," and "Notes on fungi from the eastern highlands of Papua New Guinea."

Like the first section, the final one, Ecology, comprises 11 chapters, including "Ectomycorrhizal fungi above and below ground in a small isolated aspen stand," "Fungal diversity and fruit body production in relation to vegetation structure, topography, and soil properties in a *Quercus mongolica* forest in central Korea," "Mycorrhizal associations in dryland riparian forests of the southwestern United States," "Diversity and role of ectomycorrhizal fungi on a revegetated mine site in southwest Virginia," and 'Temporal and spatial variation in the spore rain of *Gymnopus subnuda* measured by the spore trap method."

The papers are presented in academic style, and the illustrations are all in black and white. Nonetheless, most of the chapters should be readily accessible for any NAMA member curious to know what's out there in the woods and what the many fungi we seek are doing for a living.

—Steve Trudell
Seattle, Washington

Ordering information: NYBG Order No. MEM-89, $68.00 plus s/h. Web site: www.nybg.org. E-mail: <nybgpress@nybg.org>. Tel. (718) 817-8721.

Poisonous Mushrooms.
See story beginning on page 1.

Amanita muscaria var. *muscaria*. Photo courtesy of John Plischke III

Top: Pleurocybella porrigens, or Angel's Wings, growing at Devil's Lake Park, Wisconsin.

Bottom: *Pleurocybella porrigens*, or Angel's Wings, growing at Indian Lake Park, Wisconsin.

Photos courtesy of Steve Nelsen

Amanita phalloides. Photo courtesy of John Plischke III

Amanita pantherina. Photo courtesy of John Plischke III

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Newsletter of the North American Mycological Association
THE MYCOPHILE

Mushroom of the Month

This month's featured fungus is *Amanita muscaria* var. *formosa*. See inside this issue for NAMA's Summary of Mushroom Poisonings in 2004 along with lovely photos of "the usual suspects."

Photo courtesy of John Plischke III